

BOGARD ROAD EXTENSION EAST PHASE II PEDESTRIAN UNDERPASS RET. WALLS

MATANUSKA - SUSITNA BOROUGH, ALASKA

CONTACT INFORMATION:

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SHEET RTW3.2 - SECTIONS AND DETAILS

PART 1: GENERAL

SUMMARY

- WORK SHALL CONSIST OF FURNISHING ALL MATERIALS, LABOR, EQUIPMENT, AND SUPERVISION FOR CONSTRUCTION OF HILFIKER WELDED WIRE RETAINING WALL SYSTEMS IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND WITHIN THE SPECIFIED TOLERANCES FOR THE LINES, GRADES, DESIGN AND DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS.
- WHERE INDICATED IN THESE GENERAL NOTES, THE AKDOT STANDARD SPECS REFER TO THE MOST RECENT VERSION OF THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

PART 2: MATERIALS

RETAINING WALL SYSTEM

- RETAINING WALL SYSTEMS SHALL CONSIST OF THE HILFIKER WELDED WIRE WALL SYSTEM. NO SUBSTITUTIONS ARE ALLOWED.

WIRE REINFORCEMENT AND CAP MESH

- WELDED WIRE FABRIC (WWF) FOR FACING, REINFORCING MESH, AND CAP MESH SHALL BE WELDED INTO THE FINISHED MESH FABRIC CONFORMING TO THE MINIMUM REQUIREMENTS OF ASTM A-1064, WITH A MINIMUM YIELD STRENGTH OF 65 KSI. WWF SIZES SHALL BE AS SHOWN ON THE PLANS AND HOT DIPPED GALVANIZED WITH A MINIMUM APPLICATION OF 2.0 OZ/SF OR A MINIMUM THICKNESS OF 3.4 MILS. ANY DAMAGE DONE TO THE GALVANIZATION PRIOR TO INSTALLATION SHALL BE REPAIRED IN AN ACCEPTABLE MANNER AND IN A GALVANIZED COATING COMPARABLE TO THAT PROVIDED.
- BACKING MATS:** STEEL BACKING MAT SHALL BE W5 VERTICAL X W2.5 HORIZONTAL MINIMUM (.2582" [6.6 MM] X .178" [4.5 MM] NOM. DIA.) WELDED WIRE FABRIC MEETING ASTM A-1064 AND HOT DIP GALVANIZED (2.0 OZ./SF, ASTM A-123; 605 G/M2).
- HARDWARE CLOTH:** 20-GAUGE METALLIC HARDWARE CLOTH SCREEN, OR 23-GAUGE PVC COATED (BROWN OR GREEN) HARDWARE CLOTH SCREEN WITH OPENINGS NOT EXCEEDING ¼ INCH (6.4 MM) AND A ROLL WIDTH OF 26-INCHES. THE HARDWARE CLOTH SCREEN SHALL BE IN ACCORDANCE WITH ASTM A-740 AND SHALL BE PLACED BETWEEN THE BACKFILL AND STEEL BACKING MAT. A MINIMUM VERTICAL LAP OF 2" AND HORIZONTAL LAP OF 1" MUST BE MAINTAINED TO RETAIN THE WALL BACKFILL.

GEOTEXTILE FILTER FABRIC

- FILTER FABRIC FOR WWF WALL FACING SHALL BE A CLASS 2 NONWOVEN GEOTEXTILE FABRIC AS SPECIFIED IN SECTION 729-2.02.1 OF THE AKDOT STANDARD SPECS.

BACKFILL

- REINFORCED BACKFILL SHALL MEET THE REQUIREMENTS FOR SELECTED MATERIAL, TYPE A, AS SPECIFIED IN SECTION 511-2.01.1 OF THE AKDOT STANDARD SPECS (INCLUDING ELECTROCHEMICAL REQUIREMENTS). REINFORCED BACKFILL SHALL ALSO HAVE 100 PERCENT PASSING THE 6 INCH SIEVE AND 75 TO 100 PERCENT PASSING THE 3 INCH SIEVE.
- FACING ROCK SHALL BE HARD, ANGULAR, ROKC HAVING NO MORE THAN 50% WEAR AT 500 REVOLUTIONS AS DETERMINED BY AASHTO 7 96 AND RANGE IN SIZE FROM 3 INCHES TO A MAXIMUM OF 6 INCHES.
- RETAINED SOIL SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS AND WHEN COMPACTED, SHALL MEET OR EXCEED THE DESIGN SOIL PROPERTIES SPECIFIED IN PART 3.

PART 3: DESIGN CRITERIA

DESIGN PARAMETERS:

- DESIGN OF OF WELDED WIRE WALLS FOR THIS PROJECT ARE BASED ON THE FOLLOWING UNFACTORED PARAMETERS AS PROVIDED IN THE PROJECT GEOTECH REPORT BY DOWL HKM:

SOIL PROPERTIES	REINF. BACKFILL	RETAINED SOIL	FOUNDATION SOIL
UNIT WEIGHT (PCF)	130	130	130
FRICTION ANGLE (DEG)	36	36	36
COHESION (PSF)	0	0	0
As*			0.568

*EXTERNAL STABILITY FOR LRFD EXTREME I LOAD GROUP IS DISPLACEMENT- BASED IN ACCORDANCE WITH A11.5.1-1 2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS ASSUMING 4 INCHES MAXIMUM HORIZONTAL DISPLACEMENT.

SURCHARGE LOADING:

- 250 PSF TRAFFIC (HS-20) APPROXIMATELY 6 FEET BEHIND WALL FACE AND 50 PLF PEDESTRIAN RAIL APPLIED TO TOP 2 REINF. LAYERS.

LRFD LOAD AND RESISTANCE FACTORS:

- RETAINING WALLS FOR THIS PROJECT HAVE BEEN DESIGNED IN ACCORDANCE WITH AASHTO LRFD METHODOLOGIES USING THE COMPUTER PROGRAM MSEW USING THE FOLLOWING LOAD AND RESISTANCE FACTORS:

LOAD FACTORS:

INTERNAL STABILITY	FACTOR
VERTICAL EARTH PRESSURE (EV)	1.35
EARTHQUAKE	1.0

LOCAL EXTERNAL STABILITY

FACTOR
INTERNAL VERTICAL EARTH
STATIC SLIDE & ECCEN.
STATIC/SEISMIC SLIDE & ECCEN.
STATIC BEARING CAP.
STATIC/SEISMIC BEARING CAP.

EXTERNAL EARTH PRESSURES
ACTIVE LATERAL EARTH
SEISMIC ACTIVE LATERAL EARTH
SEISMIC LATERAL EARTH
LIVE LOAD SURCHARGE
DEAD LOAD SURCHARGE

RESISTANCE FACTORS:

<u>INTERNAL STABILITY</u>	<u>STATIC</u>	<u>STATIC/SEIS.</u>
REINFORCEMENT		
STRENGTH:	0.9	1.2
REINFORCEMENT PULLOUT:	0.9	1.2
CONNECTION:	0.9	1.2

LOCAL EXTERNAL

REINF./FND. SOIL SLIDE
REINF. SOIL/REINF. SLIDE
BEARING CAPACITY

PART 3: DESIGN CRITERIA (CONT.)

HYDROSTATIC DESIGN

- WALLS ASSUMED TO BE FULLY DRAINED. HOWEVER, GROUNDWATER ASSUMED TO BE AT BASE OF WALL.

DRAINAGE

- SURFACE AND SUBSURFACE WATER SHALL BE COLLECTED AND DIVERTED AWAY FROM WALLS DURING AND AFTER CONSTRUCTION.

MAXIMUM BEARING PRESSURES:

- THE MAXIMUM CALCULATED BEARING PRESSURES AT THE FOUNDATION LEVEL ARE SHOWN ON THE ELEVATION VIEW FOR EACH WALL. IT IS THE RESPONSIBILITY OF THE PROJECT GEOTECHNICAL ENGINEER TO DETERMINE THAT THESE CALCULATED APPLIED BEARING PRESSURE ARE ACCEPTABLE (INCLUDING ANTICIPATED SETTLEMENTS FROM THE APPLIED BEARING PRESSURES) FOR THE SOIL CONDITIONS AT EACH WALL.

PART 4: EXECUTION

VERIFICATION OF EXISTING SITE CONDITIONS

- THE CONTRACTOR SHALL VERIFY ON-SITE GRADES AND EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION. THE OWNER, THE OWNER'S ENGINEER, AND WALL DESIGN ENGINEER SHALL IMMEDIATELY BE NOTIFIED OF PREEXISTING SURFACE OR SUBSURFACE CONDITIONS DIFFERING FROM THOSE INDICATED IN THE PLANS, OR PREEXISTING SURFACE, SUBSURFACE CONDITIONS OR SOIL PROPERTIES OF AN UNUSUAL NATURE, DIFFERING MATERIALLY FROM THOSE SHOWN AND GENERALLY RECOGNIZED AS INHERENT IN WORK OF THE CHARACTER PROVIDED FOR IN THESE PLANS.

EXCAVATION

- THE CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES REQUIRED FOR CONSTRUCTION OF THE WALLS AS SHOWN ON THE DESIGN DRAWINGS.
- TEMPORARY EXCAVATION STABILITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FOUNDATION PREPARATION

- PRIOR TO CONSTRUCTION OF WALLS, THE CONTRACTOR SHALL CLEAR AND GRUB THE REINFORCED FILL ZONE SUBGRADE AREAS, REMOVING TOPSOIL, PEAT, BRUSH, SOD, OR OTHER ORGANIC OR DELETERIOUS MATERIALS.
- FOLLOWING EXCAVATION FOR THE REINFORCED SOIL ZONE AREA, THE PROJECT GEOTECHNICAL ENGINEER SHALL BE PROVIDED AN OPPORTUNITY TO OBSERVE FOUNDATION SUBGRADE CONDITIONS. FOUNDATION SUBGRADE CONDITIONS SHALL BE COMMENSURATE WITH THE DESIGN PARAMETERS STATED PART 3, DESIGN CRITERIA.
- ANY SOFT OR UNSUITABLE AREAS IDENTIFIED DURING SUBGRADE OBSERVATION SHALL BE EXCAVATED AND REPLACED OR STABILIZED AS RECOMMENDED BY THE PROJECT GEOTECHNICAL ENGINEER.
- PREPARATION OF FOUNDATION SUBGRADES WITH REGARDS TO FROST-SUSCEPTIBLE SOILS, INCLUDING REMOVAL AND REPLACEMENT IF NECESSARY, SHALL BE AT THE DIRECTION OF THE PROJECT GEOTECHNICAL ENGINEER. THE DESIGN PROVIDED HEREIN DOES NOT ADDRESS FROST-SUSCEPTIBLE SUBGRADE OR OTHER FROST-SUSCEPTIBLE SOILS.

PART 4: EXECUTION CONT.

REINFORCEMENT PLACEMENT

- ALL REINFORCEMENT SHALL BE INSTALLED AT THE PROPER ELEVATION AND ORIENTATION AS SHOWN ON THESE PLANS.
- OVERLAP OF ADJACENT STRIPS OF THE REINFORCEMENT, IN THE DESIGN STRENGTH DIRECTION, SHALL NOT BE PERMITTED EXCEPT IN CORNERS WHERE UNAVOIDABLE. THE DESIGN STRENGTH DIRECTION IS THAT LENGTH OF REINFORCEMENT REINFORCEMENT PERPENDICULAR TO THE WALL FACE AND SHALL CONSIST OF ONE CONTINUOUS PIECE OF MATERIAL.
- ADJACENT SECTIONS OF REINFORCEMENT SHALL BE PLACED IN A MANNER TO ASSURE THAT THE HORIZONTAL COVERAGE IS 100%.
- REINFORCEMENT SHALL BE INSTALLED UNDER TENSION. A NOMINAL TENSION SHALL BE APPLIED TO THE REINFORCEMENT AND MAINTAINED BY STAPLES, STAKES, AND/OR HAND TENSIONING UNTIL THE REINFORCEMENT HAS BEEN COVERED BY AT LEAST 6 INCHES OF SOIL FILL.
- THE CONSTRUCTION TOLERANCES SHALL BE AS SPECIFIED BY THE CONTRACTING AGENCY.

FILL PLACEMENT

- ALL BACKFILL SHALL BE PLACED IN LIFTS NOT EXCEEDING 12-INCHES IN LOOSE THICKNESS.
- ONLY HAND OPERATED COMPACTION EQUIPMENT SHALL BE ALLOWED WITHIN 3 FEET FROM THE FACE OF WALL. FILL COMPACTED WITH HAND OPERATED EQUIPMENT SHALL BE PLACED IN LIFTS NOT EXCEEDING 8-INCHES IN LOOSE THICKNESS. ACCEPTANCE OF FILL COMPACTION WITHIN 3 FEET FROM BACK OF UNITS SHALL BE BASED ON VISUAL CONFIRMATION OF AT LEAST 3 PASSES OF COMPACTION EQUIPMENT. DENSITY TESTING SHALL NOT PERFORMED WITHIN 3 FEET OF WALL FACE.
- FILL SHALL BE PLACED, SPREAD, AND COMPACTED IN SUCH A MANNER THAT ELIMINATES THE DEVELOPMENT OF WRINKLES OR MOVEMENT OF THE REINFORCEMENT AND WALL FACING.
- EACH LIFT OF FILL SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE ASTM D1557 TEST METHOD.
- TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE REINFORCEMENT. A MINIMUM FILL THICKNESS OF 6 INCHES IS REQUIRED PRIOR TO OPERATION OF TRACKED VEHICLES OVER THE REINFORCEMENT. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT DISPLACING THE FILL AND DAMAGING OR MOVING THE REINFORCEMENT.
- RUBBER-TIRED EQUIPMENT MAY PASS OVER THE REINFORCEMENT, IF PERMITTED BY THE MANUFACTURER, AT SLOW SPEEDS (LESS THAN 10 MPH). SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.
- AT THE END OF EACH DAY'S OPERATION, THE CONTRACTOR SHALL SLOPE THE FILL AWAY FROM THE WALL FACING TO DIRECT RUNOFF AWAY FROM THE WALL FACE. IN ADDITION, THE CONTRACTOR SHALL NOT ALLOW SURFACE RUNOFF FROM ADJACENT AREAS TO ENTER THE WALL CONSTRUCTION SITE.

PART 4: EXECUTION CONT.

UTILITIES WITHIN REINFORCED FILL ZONE

- CONSTRUCTION OF UTILITIES OR STRUCTURES THAT LIE WITHIN THE REINFORCED ZONE SHALL BE COORDINATED WITH WALL CONSTRUCTION. EXCAVATION INTO THE REINFORCED ZONE FOLLOWING WALL CONSTRUCTION SHALL NOT BE PERMITTED. ANY DAMAGE CAUSED FOLLOWING COMPLETION OF THE WALLS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND OWNER'S ENGINEER AND SHALL BE IMMEDIATELY CORRECTED.

QUALITY CONTROL

- THE OWNER SHALL APPOINT A GEOTECHNICAL ENGINEERING FIRM TO PERFORM INSPECTION AND TESTING, WHICH SHALL INCLUDE:
 - FOUNDATION: EVALUATION OF SUBGRADES FOR FILL PLACEMENT, BEARING CAPACITY, SETTLEMENT, AND FROST-SUSCEPTIBILITY;
 - FILL PLACEMENT: COMPACTION TESTING OF BACKFILL;
 - BACKFILL MATERIAL ACCEPTANCE;
 - REINFORCEMENT PLACEMENT;
 - BACKFILLS AND PIPES: EVALUATION OF MATERIALS FOR SUITABILITY AND PLACEMENT.
- THE ABOVE FIELD INSPECTION AND TESTING WILL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO MEET THE MORE STRINGENT OF THE DESIGN DRAWINGS, MANUFACTURER'S REQUIREMENTS AND THE PROJECT SPECIFICATIONS.

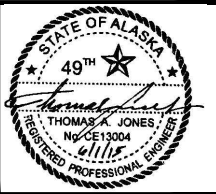
PART 5: SPECIAL DESIGN PROVISIONS

- WALL ELEVATION VIEWS AND LOCATIONS, AND GEOMETRY OF EXISTING STRUCTURES MUST BE VERIFIED BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
- THE RETAINING WALL DESIGN PROVIDED ON THESE PLANS IS BASED, IN PART, ON SOIL DESIGN PARAMETERS AS SPECIFIED IN THE PROJECT GEOTECHNICAL ENGINEERING REPORT (SUBSURFACE EXPLORATION AND GEOTECHNICAL RECOMMENDATIONS, BOGARD ROAD EXTENSION EAST, PALMER, ALASKA) PREPARED BY DOWL HKM DATED JUNE, 2013. ZIPPER GEO ASSOCIATES HAS RELIED ON THIS INFORMATION IN ITS DESIGN COMPUTATIONS. ZIPPER GEO ASSOCIATES SHALL NOT BE LIABLE FOR INTERPRETATION OF SUBSURFACE SOIL AND GROUNDWATER CONDITIONS OR DEVELOPMENT OF SOIL DESIGN PROPERTIES DONE BY OTHERS.
- THE OWNER OR OWNER'S REPRESENTATIVE IS RESPONSIBLE FOR REVIEWING AND VERIFYING THAT THE ACTUAL SITE CONDITIONS ARE AS DESCRIBED IN THESE GENERAL NOTES PRIOR TO AND DURING CONSTRUCTION. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE ON-SITE TO ASSURE CONSTRUCTION IS IN ACCORDANCE WITH THESE NOTES AND DRAWINGS AND THE CONTRACT PLANS AND SPECIFICATIONS.
- IF SITE CONDITIONS OR DESIGN PARAMETERS ARE DIFFERENT THAT WHAT HAS BEEN PRESENTED HEREIN, ZGA SHALL BE CONTACTED IMMEDIATELY TO ASSESS THE NEED FOR DESIGN REVISIONS.
- ANY REVISIONS TO DESIGN PARAMETERS STATED IN HEREIN OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS BY ZGA PRIOR TO PROCEEDING WITH CONSTRUCTION.

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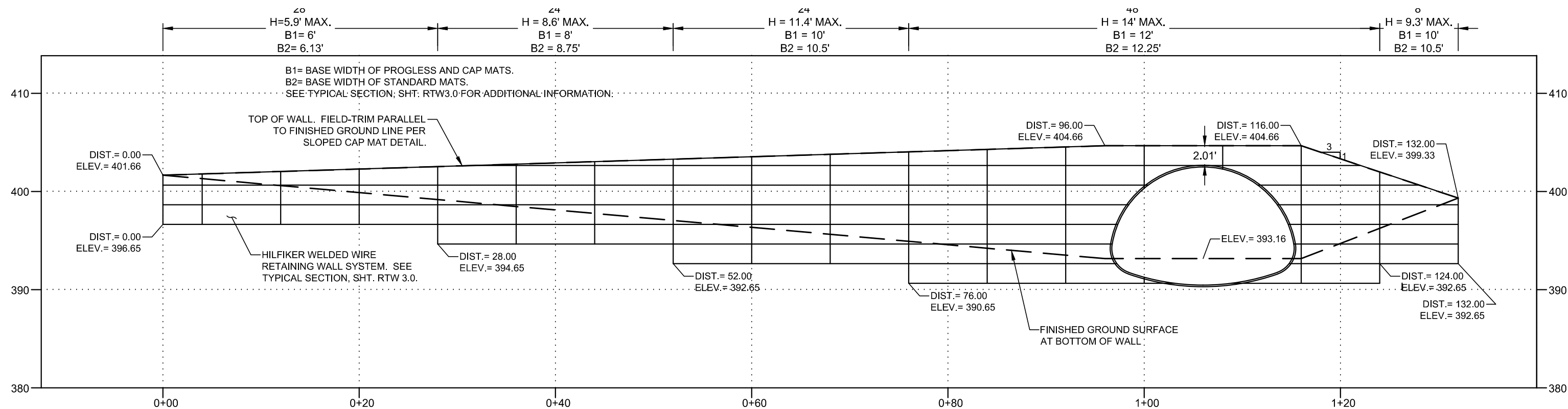
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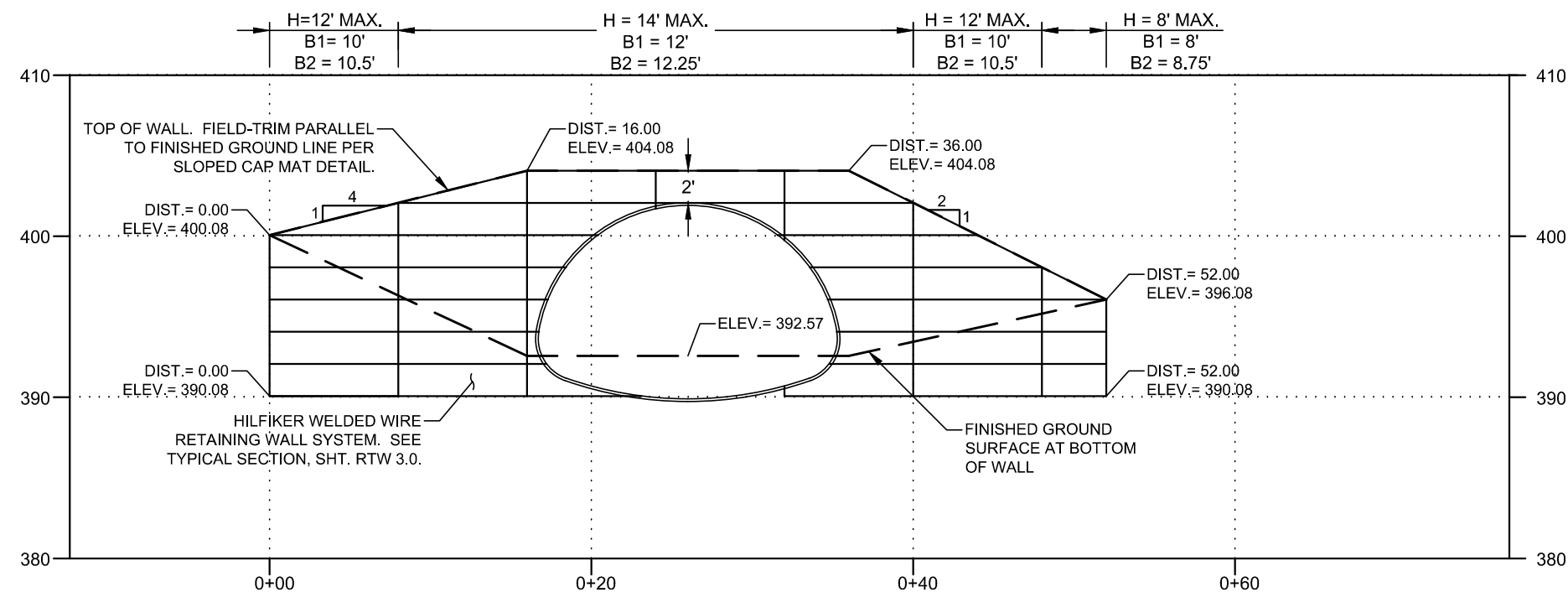
BOGARD RD. EXTNSN. E. PHASE II
PEDESTRIAN UNDERPASS RET. WALLS
MATANUSKA - SUSITNA BOROUGH, ALASKA

COVER SHEET

DRAWING
RTW 1.0
SHEET
1
OF
5



1
-
ELEVATION VIEW (NORTH HEADWALL / WINGWALL FRONT FACE)



2
-
ELEVATION VIEW (SOUTH HEADWALL / WINGWALL FRONT FACE)

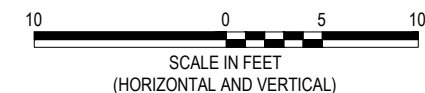
BEARING PRESSURES:

NORTH WALL

MAXIMUM FACTORED STATIC BEARING PRESSURE = 3,613 PSF
MAXIMUM FACTORED SEISMIC BEARING PRESSURE = 5,608 PSF
MAXIMUM SERVICE LOAD (UNFACTORED) BEARING PRESSURE = 2,572 PSF

SOUTH WALL

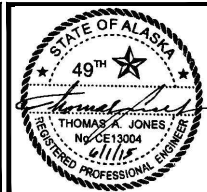
MAXIMUM FACTORED STATIC BEARING PRESSURE = 3,613 PSF
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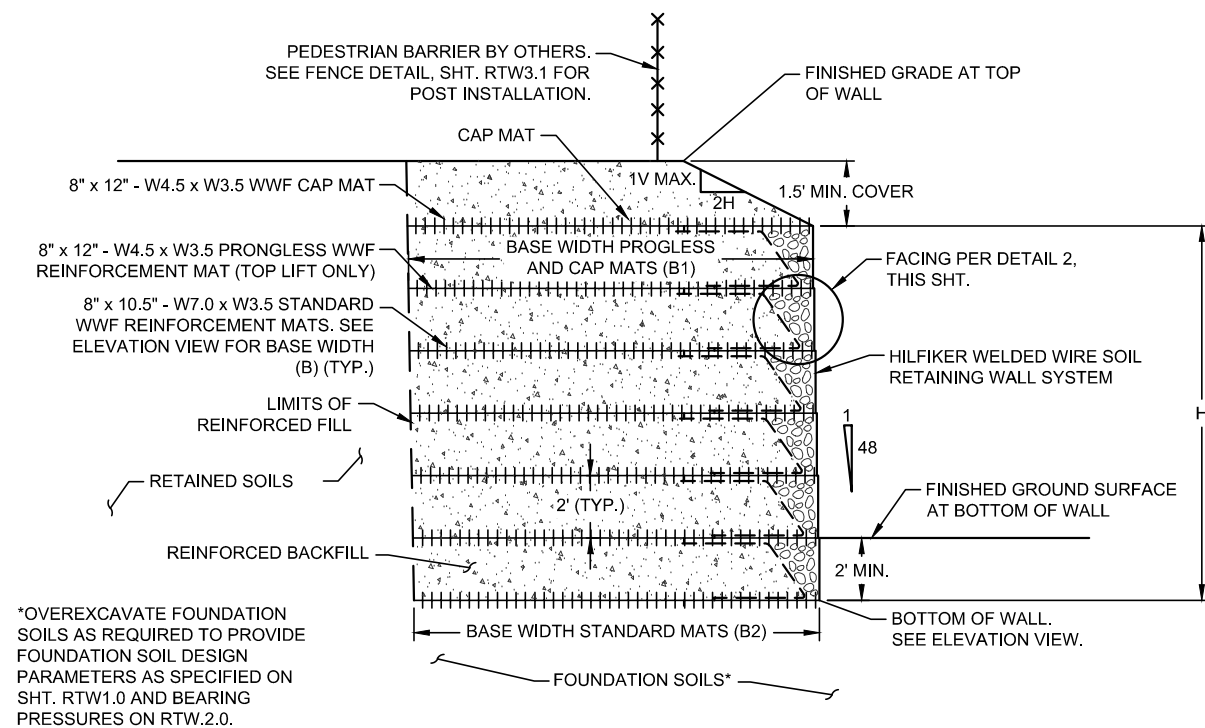
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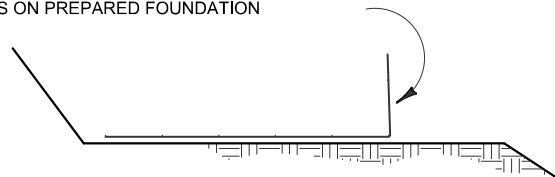
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ELEVATION VIEWS

DRAWING
RTW 2.0
SHEET
2
OF
5

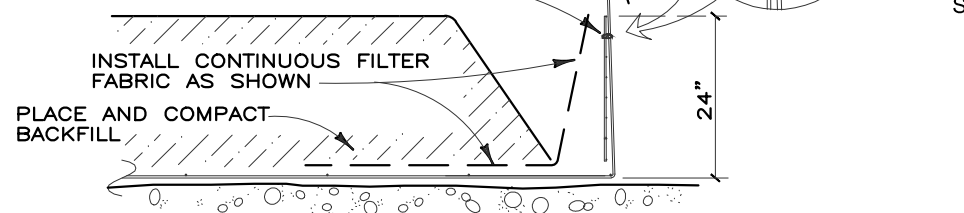


PLACE THE FIRST COURSE OF SOIL REINFORCEMENT MATS ON PREPARED FOUNDATION



STEP 2

PLACE THE BACKING MAT AGAINST THE INSIDE FACE OF THE SOIL REINFORCEMENT MAT. CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP TRANSVERSE WIRE ON THE SOIL REINFORCEMENT MAT.



TOP WIRE ON
BACKING MAT

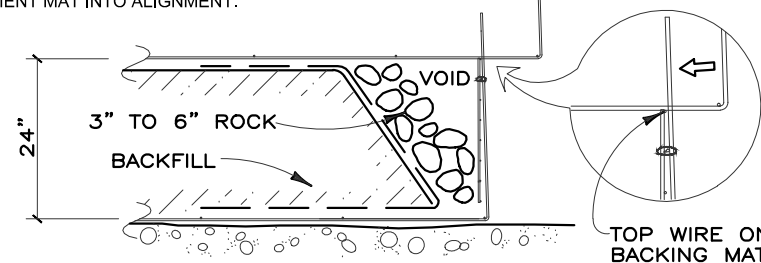
A diagram showing a wire mesh fence with a horizontal wire. A small metal ring, labeled "HOG RING", is attached to the horizontal wire. The ring is shown in a cross-sectional view, indicating its shape and how it fits onto the wire.

24"

STEP 3

BRING THE FILTER FABRIC OVER THE FRONT AND TOP OF THE BACKFILL AS SHOWN. PLACE THE ROCK IN THE FACE OF THE WALL. LEAVE A VOID AS SHOWN.

PLACE THE SECOND COURSE OF SOIL REINFORCEMENT MATS WITH THE BASE LONGITUDINAL WIRES RESTING ON THE TOP TRANSVERSE WIRE OF THE BACKING MAT BELOW. SLIDE THE SOIL REINFORCEMENT MAT INTO ALIGNMENT.



"40"

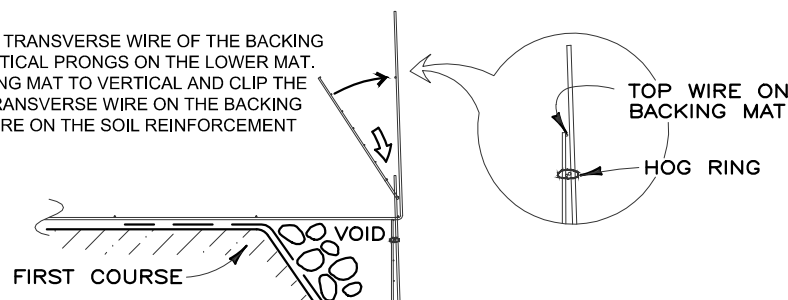
BACKFILL 1

—SECOND COURSE
SOIL REINFORCE-
MENT MAT

TOP WIRE ON
BACKING MAT

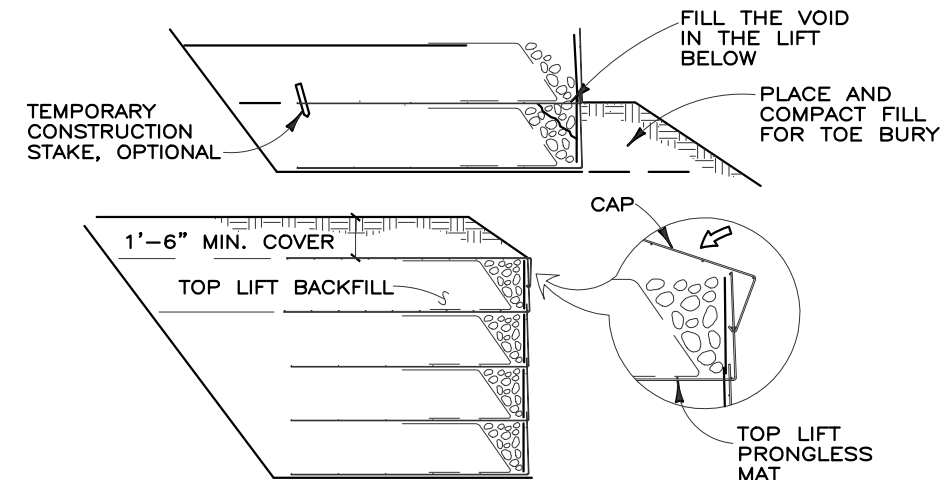
STEP 4

HOOK THE BOTTOM TRANSVERSE WIRE OF THE BACKING MAT OVER THE VERTICAL PRONGS ON THE LOWER MAT. ROTATE THE BACKING MAT TO VERTICAL AND CLIP THE SECOND-TO-TOP TRANSVERSE WIRE ON THE BACKING MAT TO THE TOP WIRE ON THE SOIL REINFORCEMENT MAT.



STEP 5

INSTALL THE FILTER FABRIC AS IN STEPS 2 AND 3. PLACE AND COMPACT THE BACKFILL AND ROCK TO THE BASE ELEVATION OF THE NEXT MAT. REPEAT STEPS 2 THROUGH 5 TO THE TOP LIFT.



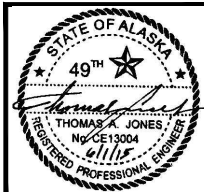
STEP 6: TOP LIFT

PLACE THE TOP LIFT PRONGLESS MAT, BACKING MAT AND FILTER FABRIC. PLACE AND COMPACT BACKFILL AND ROCK IN THE TOP LIFT. HOOK THE CAP OVER THE MIDDLE TRANSVERSE WIRE ON THE PRONGLESS MAT, AND ROTATE INTO PLACE. PLACE AND COMPACT COVER OVER TOP MAT TO 1'-6" MINIMUM DEPTH.

4 CONSTRUCTION SEQUENCE

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SINCE 1902
QUALITY

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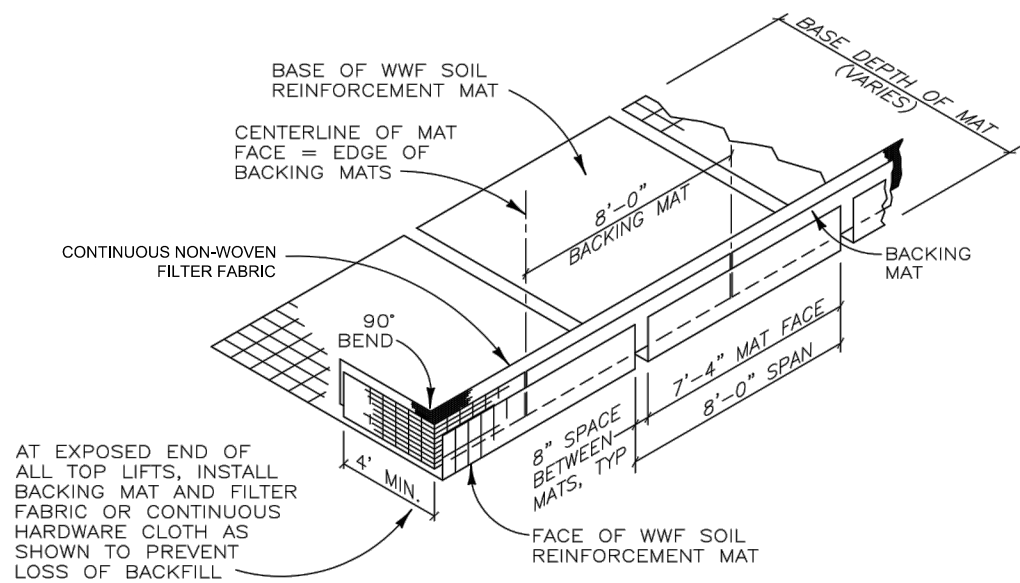
SECTIONS AND DETAILS

HRW 150409DW

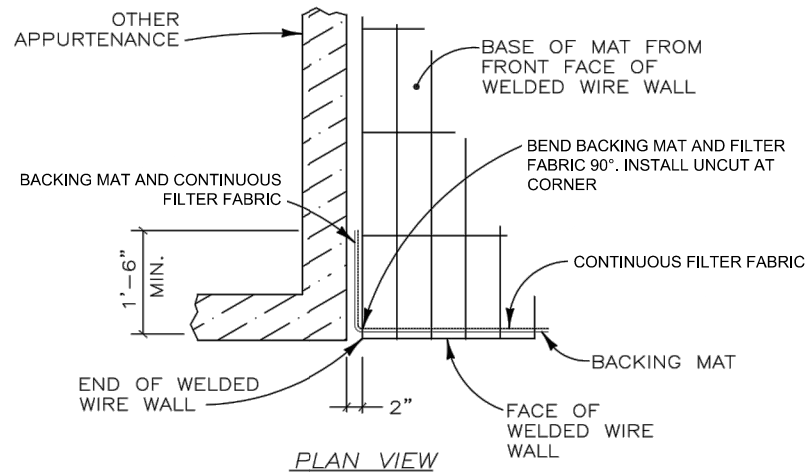
DRAWING

RTW 3.0

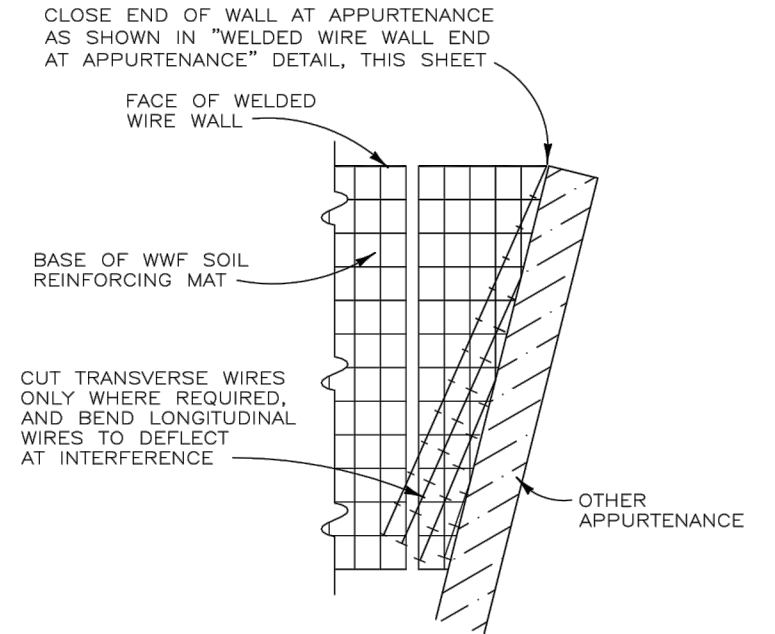
SHEET
3
OF
5



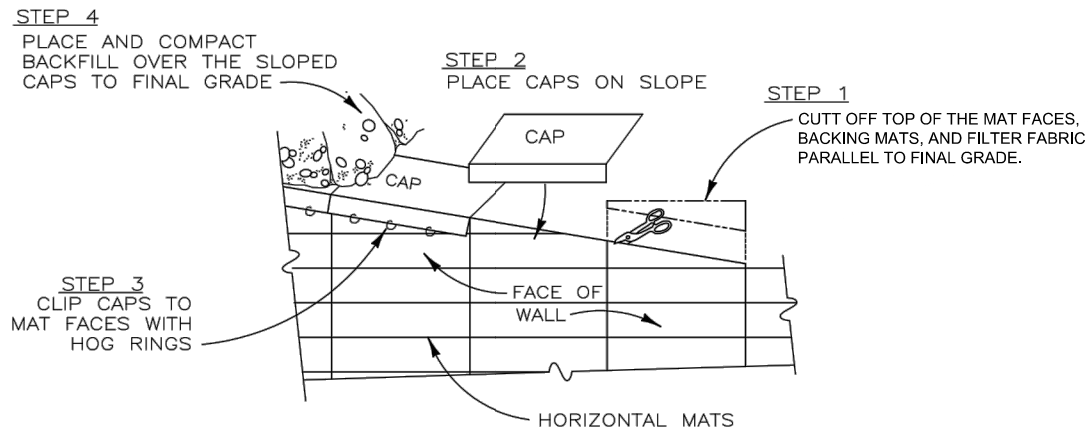
ISOMETRIC VIEW
WELDED WIRE WALL COMPONENTS WITH RETURN MAT
 NOT TO SCALE



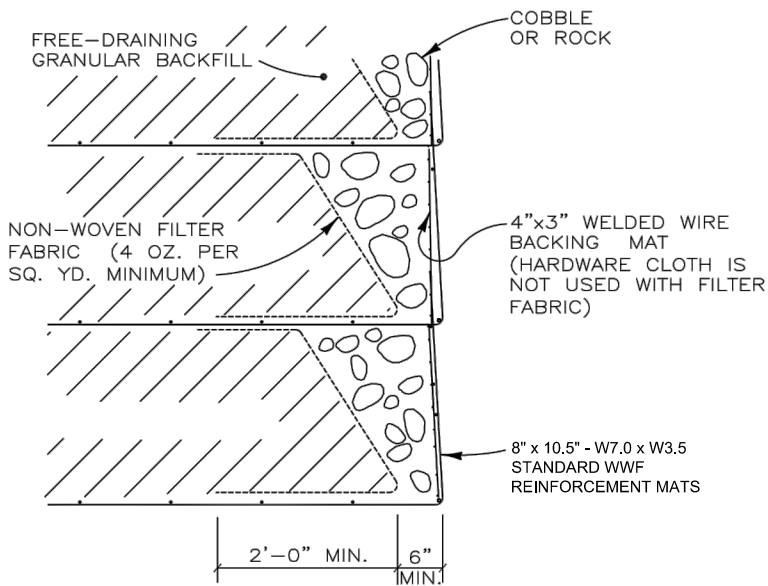
PLAN VIEW
WELDED WIRE WALL END AT OTHER APPURTENANCE
 NOT TO SCALE



PLAN VIEW
DEFLECTED LONGITUDINAL WIRES
 NOT TO SCALE



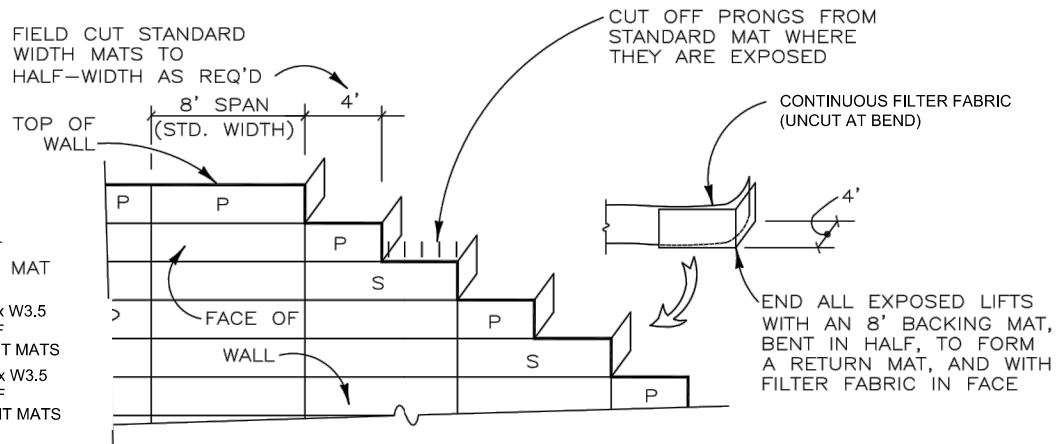
PICTORIAL ELEVATION
SLOPED CAP MAT DETAIL
 NOT TO SCALE



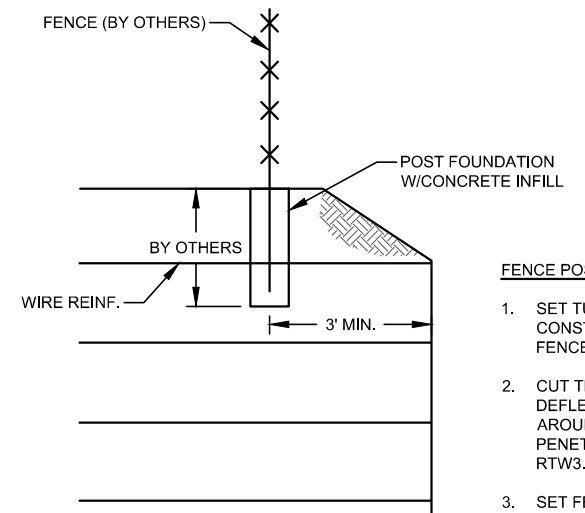
SECTION
ROCK FACING DETAIL
 NOT TO SCALE

LEGEND
 (THIS DETAIL ONLY)

P	8"x12" WWF PRONGLESS MAT
S	8" x 10.5" - W7.0 x W3.5 STANDARD WWF REINFORCEMENT MATS
	8" x 10.5" - W7.0 x W3.5 STANDARD WWF REINFORCEMENT MATS



RETURN MATS AND TOP OF WALL DETAIL
 NOT TO SCALE

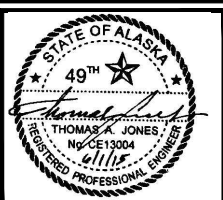


FENCE POST DETAIL
 NOT TO SCALE

HRW 150409DW

SUBMITTAL RECORD				
NO.	DATE	BY	INITIAL RELEASE	DESCRIPTION
-	6/1/15	TAJ		

DESIGNED:	RAR
DRAWN:	RAR
CHECKED:	TAJ
SCALE:	AS NOTED
DATE:	6/1/15
JOB NO.	1306.01
PLOT DATE:	6/5/15
LAST EDIT:	Rob Ross



HILFIKER RETAINING WALLS

1902 Hilfiaker Lane
 Eureka, CA 95503-5711
 TOLL-FREE 800.762.8962
 PH 707.443.5093 FAX 707.443.2891
 WEB SITE www.hilfiaker.com E-MAIL info@hilfiaker.com

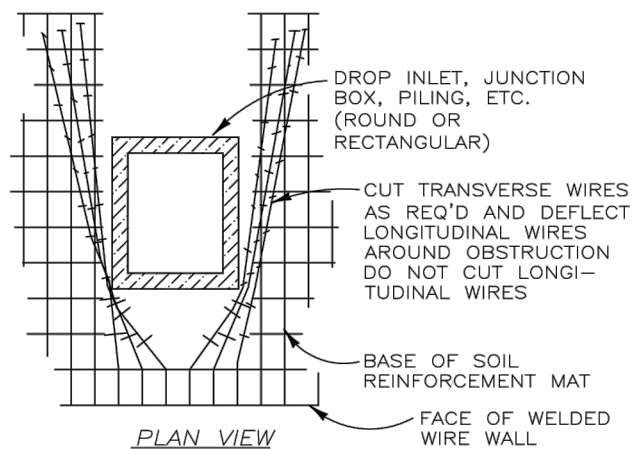
ZGA Zipper Geo Associates, LLC
 Geotechnical and Environmental Consultants

19023 36th Avenue West, Suite D | Lynnwood, WA 98036
 PH: (425) 582-9928 | Fax: (425) 582-9930 | www.zippergeo.com

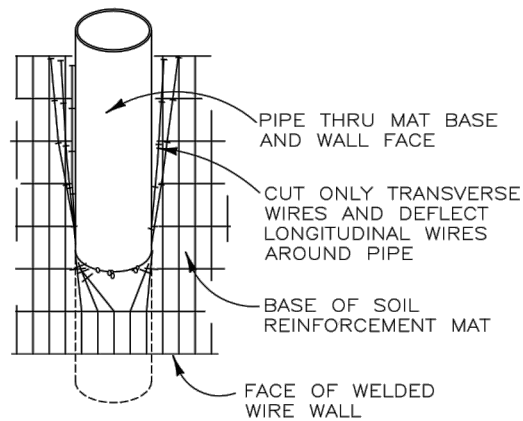
BOGARD RD. EXTNSN. E. PHASE II
 PEDESTRIAN UNDERPASS RET. WALLS
 MATANUSKA - SUSITNA BOROUGH, ALASKA

SECTIONS AND DETAILS

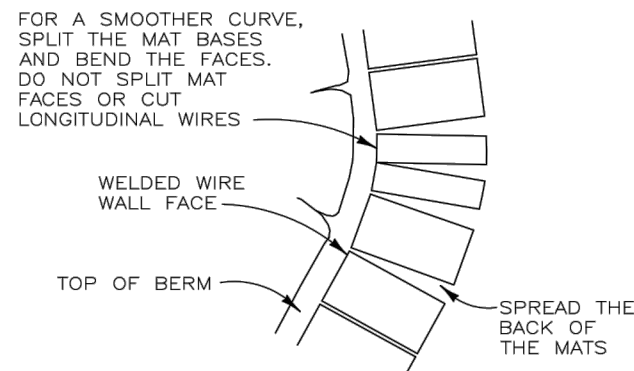
DRAWING
RTW 3.1
SHEET
4
OF
5



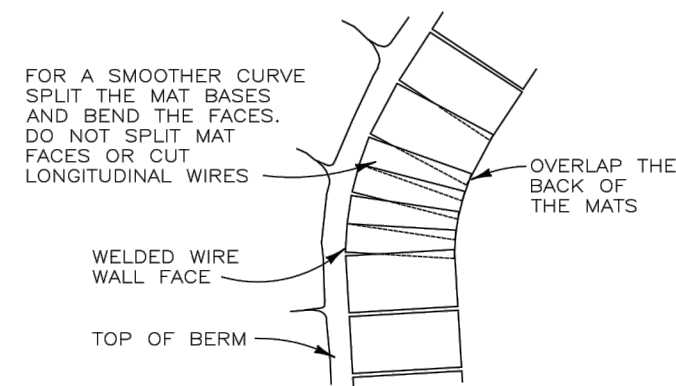
MAT PENETRATION DETAIL
NOT TO SCALE



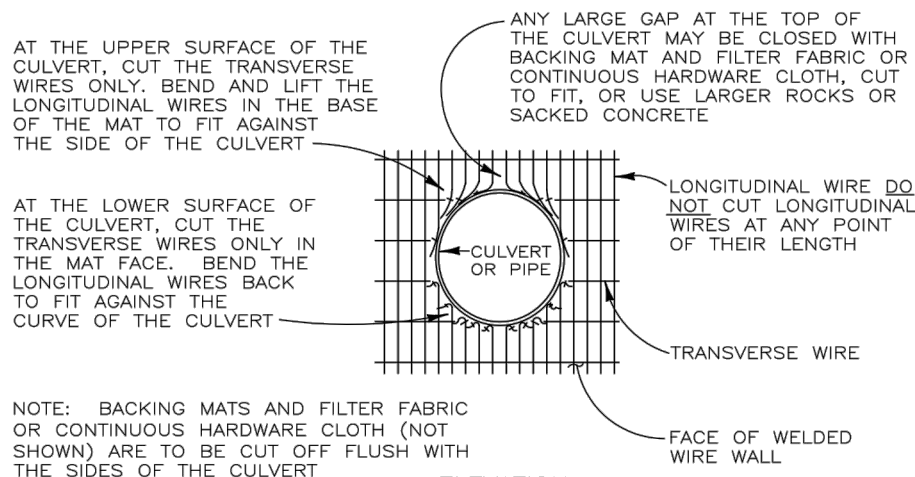
ANGLED PIPE PENETRATION
NOT TO SCALE



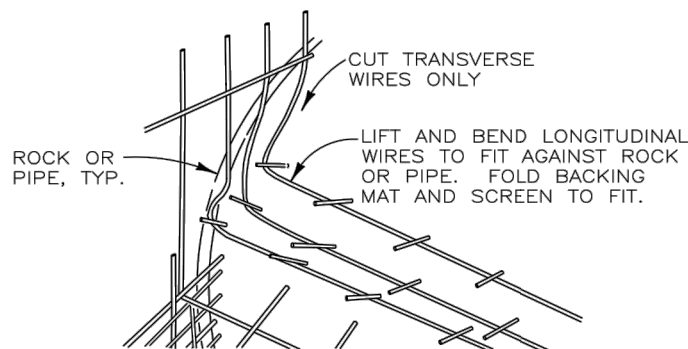
CONCAVE CURVE
NOT TO SCALE



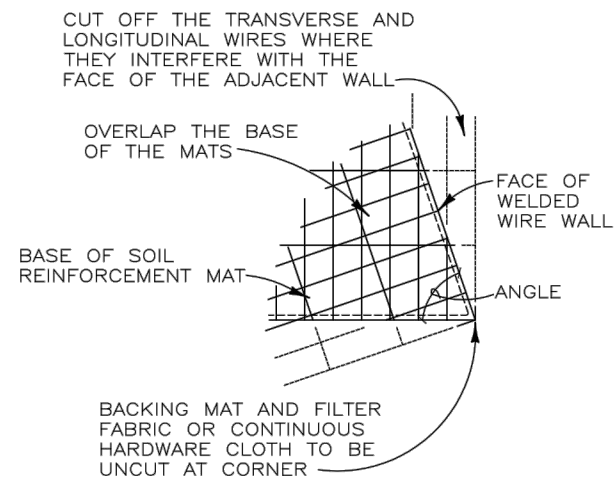
CONVEX CURVE
NOT TO SCALE



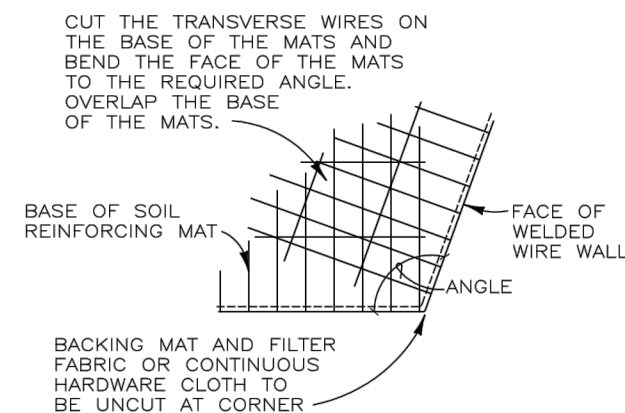
CULVERT THRU WALL FACE
NOT TO SCALE



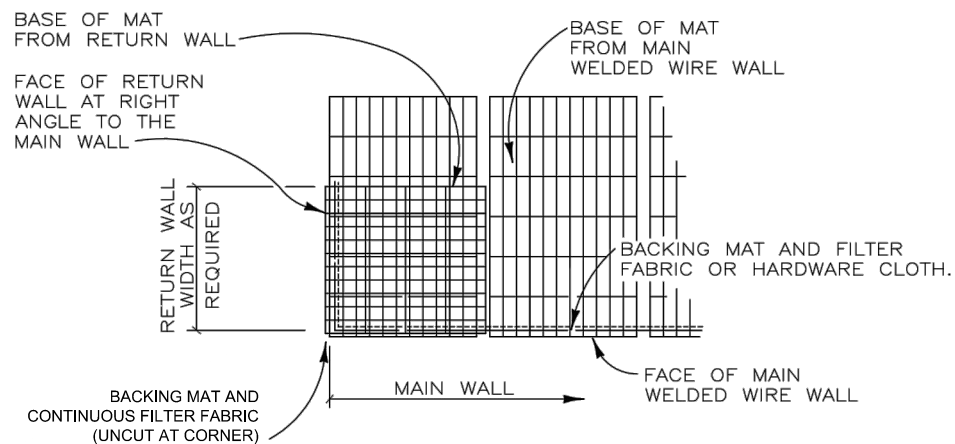
FITTING MATS TO OBSTRUCTION
NOT TO SCALE



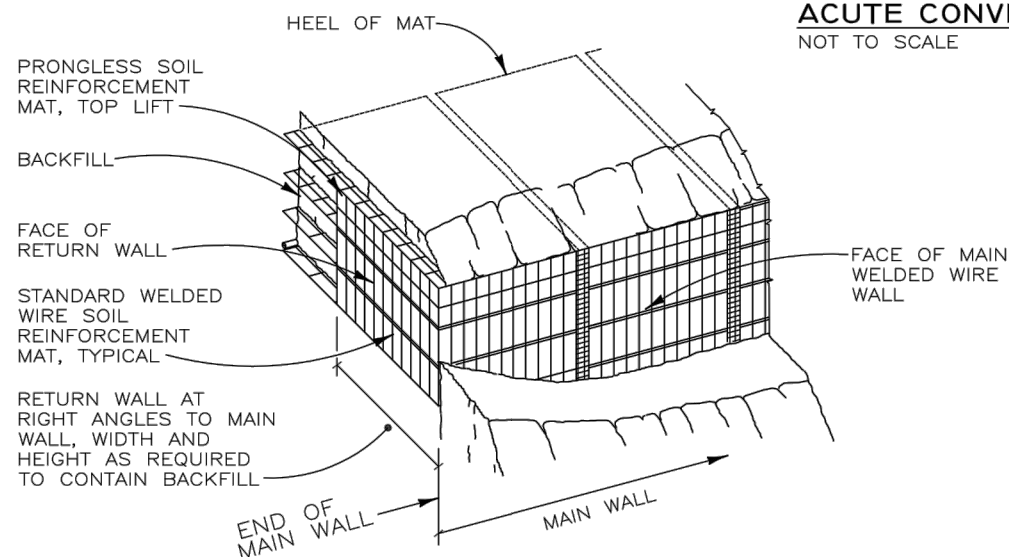
ACUTE CONVEX ANGLE
NOT TO SCALE



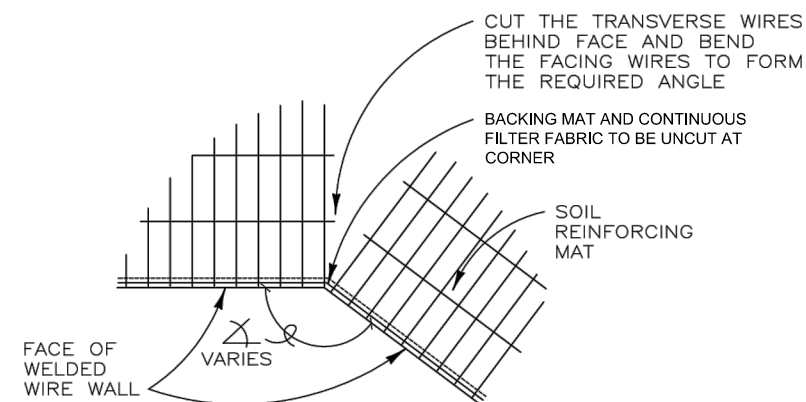
OBTUSE CONVEX ANGLE
NOT TO SCALE



RETURN WALL DETAIL
NOT TO SCALE



RETURN WALL DETAIL
NOT TO SCALE



CONCAVE ANGLE DETAIL
NOT TO SCALE

HRW 150409DW

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1902 QUALITY WALL

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BOGARD RD. EXTNSN. E. PHASE II
PEDESTRIAN UNDERPASS RET. WALLS
MATANUSKA - SUSITNA BOROUGH, ALASKA

SECTIONS AND DETAILS

DRAWING
RTW 3.2
SHEET
5
OF
5